

Synthesis of MgB₂ from MgB₄ through combinatorial solid state reaction routes.

Abstract

MgB₄ was first prepared from the elemental magnesium and boron powders, followed by acid-washed in order to remove the primary impurity of MgO. In the second step, appropriate amount of Mg was added into the MgB₄ powders and sintered in the temperature range of 650°C to 950°C for 8 hours. XRD spectra showed that MgB₂ appeared as the main phase. The relative intensity fraction for MgB₂ was found to decrease while this value was increased for MgB₄ and MgO upon increasing the sintering temperature. Scanning electron microscopy showed a denser microstructure compared to samples prepared by direct in-situ reaction of (Mg + 2B). The density was found to decrease with increasing sintering temperature possibly due to the loss of Mg.

Keyword: MgB₂; Superconductor.